# General Applications

### Rated Voltage

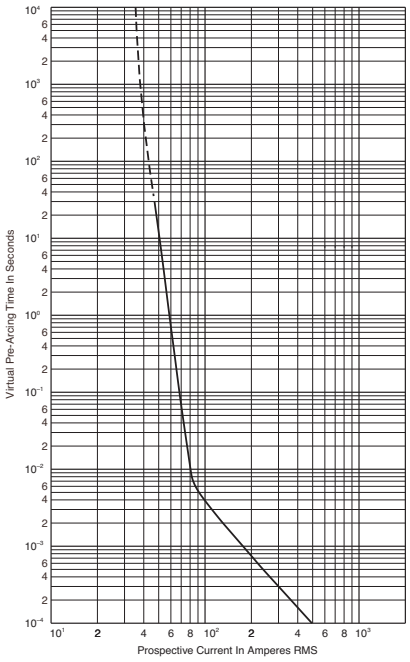
The AC voltage rating of Bussmann fuses is given in volts rms. Fuses tested to IEC are tested at 5% above their rated voltage. British Style BS 88 fuses are tested at 10% above its rated voltage. UL recognition tests are performed at the rated voltage.

### Rated Current

Rated current is given in amps rms. Bussmann fuses can continuously carry the rated current.

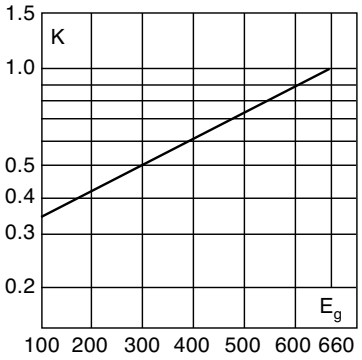
### Melting Characteristic

The melting characteristic shows the virtual melting time in seconds as a function of the prospective current in amps rms. The fuses are specially constructed for short-circuit protection against high level fault currents. Loading and operation of the fuse in the non-continuous/dashed section of the melt curve must be avoided. The curve can also be read as the real melting time as a function of the RMS value of the pre-arc current.



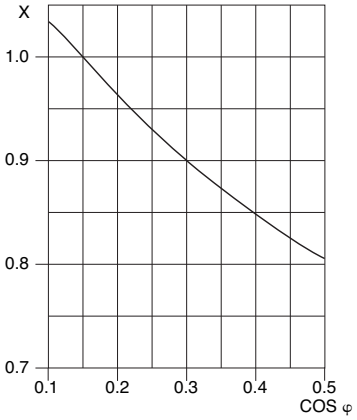

### Clearing Integrals

The total clearing $I^2t$ at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing $I^2t$ is found by multiplying by correction factor, K, given as a function of applied working voltage, $E_g$, (rms).



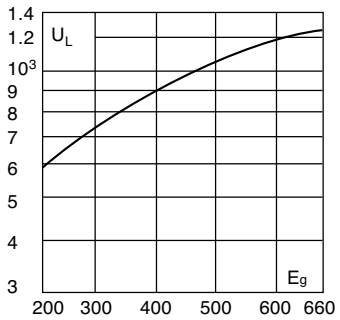

### Power Factor

For other power factor values, the total clearing integral can be calculated as a multiple of the clearing integrals, the correction factor K and the correction factor X.



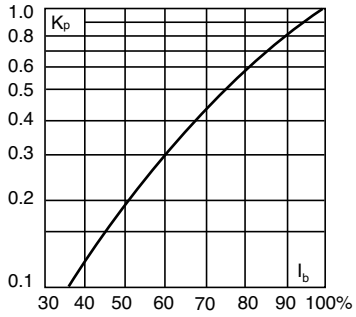

### Arc Voltage

This curve gives the peak arc voltage, $U_L$, which may appear across the fuse during its operation as a function of the applied working voltage, $E_g$, (rms) at a power factor of 15%.



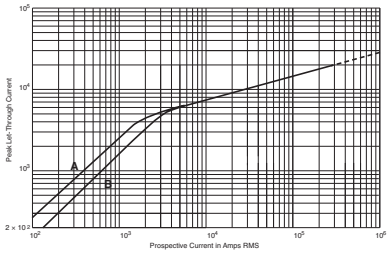

### Power Losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, $K_p$, is given as a function of the RMS load current, $I_b$, in % of the rated current.




### Cut-Off Current

A fuse operation relating to short-circuits only. When a fuse operates in its current-limiting range, it will clear a short-




circuit in less than ½ cycle. Also, it will limit the instantaneous peak let-through current to a value substantially less than

# General Applications

that obtainable in the same circuit if that fuse were replaced with a solid conductor of equal impedance.

A asymmetrical current
B symmetrical current

### Parallel Connection

When fuses are connected in parallel it is recommended that the applied voltage does not exceed 0.9 $U_N$ (the rated voltage of the fuse). This is due to the fact that the energy released within the fuses may be unevenly shared between the parallel connected barrels.

When fuses are connected in parallel, one must take into account that the current sharing is not necessarily equal. And it must be checked, that the maximum load current is not exceeded.

### Series Connection

Fuses in series may not equally divide the applied voltage. It is recommended that series connected fuses should only be operated at fault currents that yield melting times less than 10 ms and a recovery voltage per fuse of less than or equal to 0.9 $U_N$ (the rated voltage of the fuse).

### Mounting Guidance

The recommendations below have to be followed when mounting a Bussmann fuse with end plate threaded holes.

1. Screw in studs: 5 N•m Max, 3 N•m Min
2. Attachment of the fuse to bussbar by means of nut and washer:

| Thread Configuration | Torque (N•m)* Max | Min |
|---|---|---|
| 5/16" – 18, M8 | 25 | 20 |
| 3/8" – 16, M10 | 45 | 40 |
| 3/8" – 24 | 45 | 40 |
| 1/2" – 13, M12 | 65 | 50 |
| 1/2" – 20 | 65 | 50 |

*1 N•m = 0.7375 lb-ft

### Overloads

The design of Bussmann fuses is such that they can be operated under rather severe operating conditions imposed by overloads (any load current in excess of the maximum permissible load current).

In applications, there will be a maximum overload current, Imax, which can be imposed on the fuse with a corresponding duration and frequency of occurrence.

Time durations fall into two categories:

1. Overloads longer than one second
2. Overloads less than one second termed “impulse” loads.

The following table gives general application guidelines which, in the expression Imax < (% factor) x $I_t$. $I_t$ is the melting current corresponding to the time “t” of the overload duration as read from the time-current curve of the fuse. The guidelines in the table below determine the acceptability of the selected fuses for a given $I_{max}$.

| Frequency of Occurrence | Overloads (> 1 sec) | Impulse Loads (< 1 sec) |
|---|---|---|
| Less than once per month | $I_{max} < 80\% \times I_t$ | $I_{max} < 70\% \times I_t$ |
| Less than twice per week | $I_{max} < 70\% \times I_t$ | $I_{max} < 60\% \times I_t$ |
| Several times per day | $I_{max} < 60\% \times I_t$ | — |

When impulse loads are an intrinsic/normal parameter of the load current either as single pulse or in trains of pulses or when their level is higher than the melting current at 0.01 seconds (per time-current curve), contact Bussmann for application assistance.

In addition to the parameters set forth in the preceding table, the RMS value of the load current as calculated for any period of 10 minutes or more should not exceed the maximum permissible load current.

Furthermore, it is important that a fuse should not be applied in the non-continuous/dashed portion of the associated time-current curve.

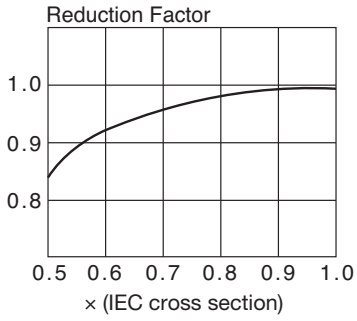
Any time-current combination point which falls in the non-continuous/dashed portion of the time-current curve is beyond the capability of the fuse to operate properly.

### DC Operation

Depending upon the short-circuit time constant and the magnitude of the prospective short-circuit current, the dc voltage at which a fuse can be applied may be less than its ac rating. Long time constants require a lower dc voltage. Conversely, however, higher available prospective short-circuit currents result in faster fuse openings and thus permit a fuse to be operated at a higher DC voltage.

Consult Bussmann for additional information and application assistance when fuses have to operate under DC conditions.

### Load Current Versus Conductor Cross Section

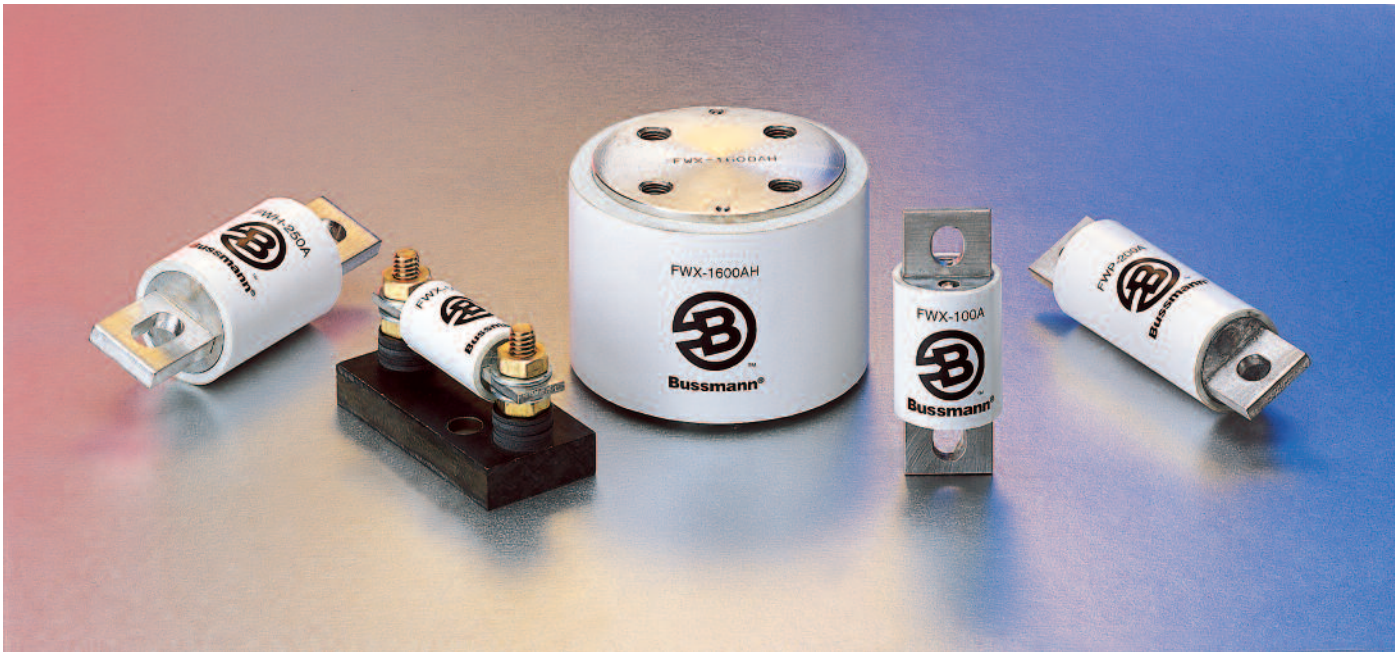



Reduction of permissible load current when the conductor cross section is less than that given in IEC Publication 269-1 & 4 valid for Bussmann high speed fuses.

### Application Assistance

If you have application problems or need a fuse outside our standard program, please contact the nearest Bussmann representative. Phone numbers are shown on the back cover.

# North American Fuses




## Introduction

### North American Contents



**Accessories**



### North American Fuse Ranges

| Amps | Volts | AC | DC |
|---|---|---|---|
| 1000-4000 | 130 | X | X |
| 70-1000 | 150 | X | X |
| 35-2500 | 250 | X | X |
| 35-1600 | 500 | X | X |
| 1-1000 | 600 | X | — |
| 5-1200 | 700 | X | X |
| 40-600 | 800 | — | X |
| 35-2000 | 1000 | X | — |

### General Information

Bussmann offers a complete range of North American blade and flush-end style fuses and accessories. Their design and construction were optimized to provide:

- Low energy let-through ($I^2t$)
- Low watts loss
- Superior cycling capability
- Low arc voltage
- Excellent DC performance

North American style fuses provide an excellent solution for medium power applications. While there are currently no published standards for these fuses, the industry has standardized on mounting centers that accept Bussmann fuses.

### Voltage Rating

All Bussmann North American style fuses are tested at their rated voltage. Bussmann should be consulted for applications exceeding those values.

### Accessories

External and internal open fuse indication is available for selected portions of the North American line. Fuse blocks are available for most applications.

# Drive Fuse High Speed Fuses

## DFJ Class J


### Specifications

**Description:** High speed, current-limiting fuse. The Bussmann Drive Fuse will provide maximum protection for AC and DC drives and controllers and meet NEC® branch circuit protection requirements. The Drive Fuse has the lowest $I^2t$ of any branch circuit fuse to protect power semiconductor devices that utilize diodes, GTOs, SCRs and SSRs.

**Dimensions:** See page 21 for Class J dimensions.

**Construction:** Melamine tube with silver fuse element.

**Ratings:**

Volts — 600Vac (or less), 450Vdc (or less)

Amps — 1-600A

IR — 200kA RMS Sym., 100kA DC

**Agency Information:** CE, Std. 248-8, Class J, UL Listed, Guide JDDZ, File E4273, CSA Certified, Class 1422-02, File 53787.

### Features and Benefits

- Easily coordinated with existing and new variable speed drives and electric controllers.
- Standard Class J dimensions allowing the use of readily available fuse blocks, holders, and switches.
- Allows the lowest let-thru energy of any branch circuit overcurrent protective device.

### Typical Applications

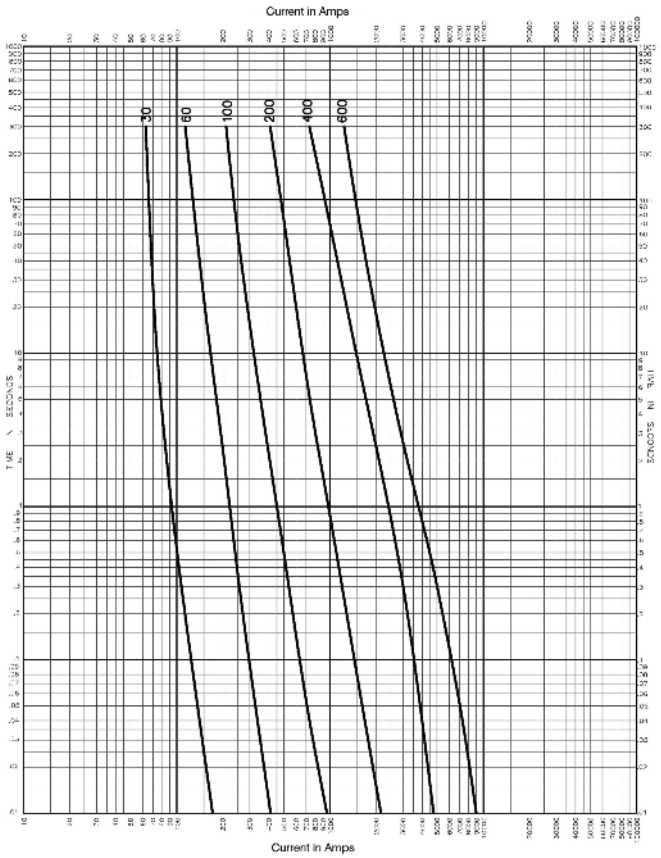
- Protection of AC and DC drives
- Equipment using power semiconductor devices

### Catalog Numbers (Amps)

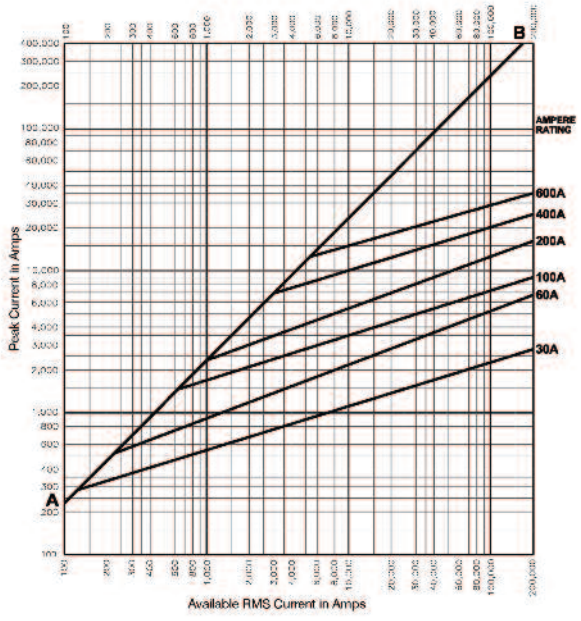
| | | | |
|---|---|---|---|
| DFJ-1 | DFJ-15 | DFJ-70 | DFJ-225 |
| DFJ-2 | DFJ-20 | DFJ-80 | DFJ-250 |
| DFJ-3 | DFJ-25 | DFJ-90 | DFJ-300 |
| DFJ-4 | DFJ-30 | DFJ-100 | DFJ-350 |
| DFJ-5 | DFJ-35 | DFJ-110 | DFJ-400 |
| DFJ-6 | DFJ-40 | DFJ-125 | DFJ-450 |
| DFJ-8 | DFJ-45 | DFJ-150 | DFJ-500 |
| DFJ-10 | DFJ-50 | DFJ-175 | DFJ-600 |
| DFJ-12 | DFJ-60 | DFJ-200 | |

**Data Sheet: 1048**

### Time-Current Characteristic Curves—Average Melt




### Current Limitation Curves



# North American — FWA 130V: 1000-4000A

## FWA


**Specifications**

**Description:** North American style flush-end high speed fuses.

**Dimensions:** See Dimensions illustrations.

**Ratings:**

Volts: — 130Vac

Amps: — 1000-4000A

IR: — 200kA RMS Sym.

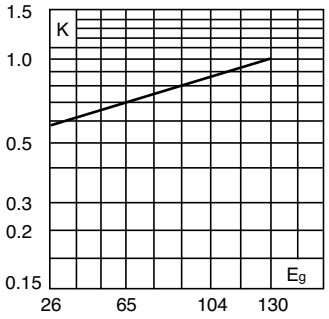
— 50kA @130Vdc

**Agency Information:** CE, UL Recognized JFHR2.E91958 on 1000-2000A fuses

### Electrical Characteristics

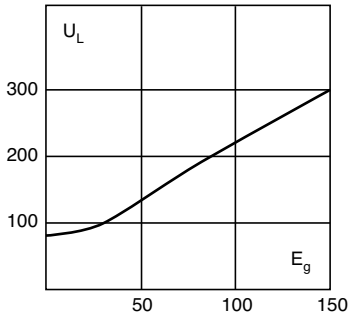
### Total Clearing $I^2t$

The total clearing $I^2t$ at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing $I^2t$ is found by multiplying by correction factor, K, given as a function of applied working voltage, $E_g$, (rms).



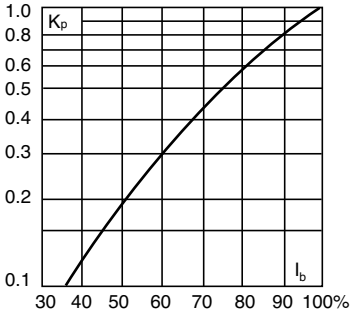

### Arc Voltage

This curve gives the peak arc voltage, $U_L$, which may appear across the fuse during its operation as a function of the applied working voltage, $E_g$, (rms) at a power factor of 15%.




### Power Losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, $K_p$, is given as a function of the RMS load current, $I_b$, in % of the rated current.




### Catalog Numbers

| Catalog Numbers | Electrical Characteristics | | | |
|---|---|---|---|---|
| | Rated Current RMS-Amps | $I^2t$ ($A^2$ Sec) | | Watts Loss |
| | | Pre-arc | Clearing at 130V | |
| FWA-1000AH | 1000 | 170000 | 460000 | 60 |
| FWA-1200AH | 1200 | 270000 | 730000 | 70 |
| FWA-1500AH | 1500 | 520000 | 1400000 | 78 |
| FWA-2000AH | 2000 | 860000 | 2400000 | 108 |
| FWA-2500AH | 2500 | 1500000 | 4100000 | 130 |
| FWA-3000AH | 3000 | 2100000 | 5700000 | 150 |
| FWA-4000AH | 4000 | 3400000 | 9200000 | 257 |

• Watts loss provided at rated current.

• See accessories on page 141.

### Features and Benefits

- Excellent DC performance
- Low arc voltage and low energy let-through ($I^2t$)
- Low watts loss
- Superior cycling capability

### Typical Applications

- DC Common bus
- DC Drives
- Power converters/rectifiers
- Reduced voltage starters

### Dimensions - in

| Catalog Number | Fig. | B | C | D | Thread Depth |
|---|---|---|---|---|---|
| FWA-1000AH-2000AH | 1 | 2.0 | 1.0 | — | Tapped ⅜"-24 x ½" |
| FWA-2500AH-3000AH | 1 | 3.0 | 1.5 | — | Tapped ½"-20 x ½" |
| FWA-4000AH | 2 | 3.5 | 1.5 | 1.5 | Tapped ½"-20 x ½" |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 1000-3000A

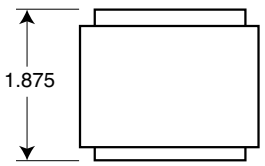
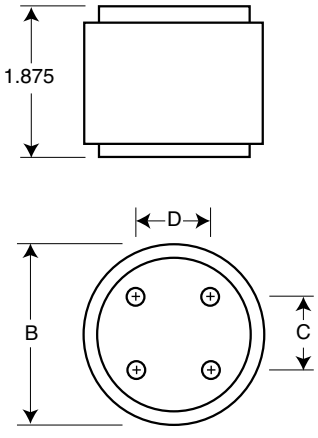



Fig. 2: 4000A

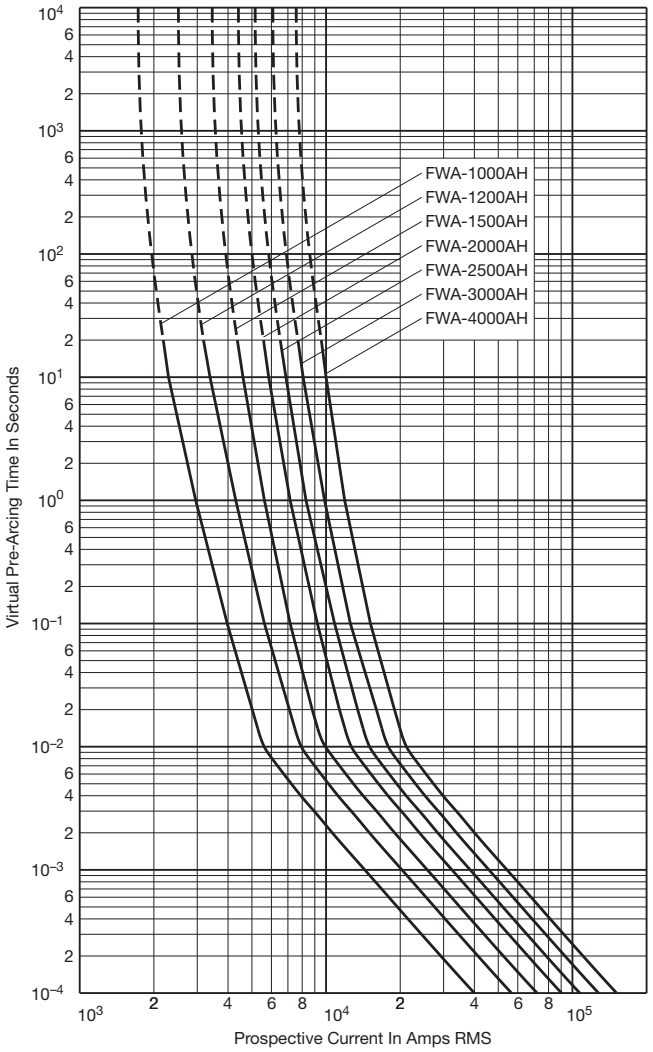



**Data Sheet: 720001**

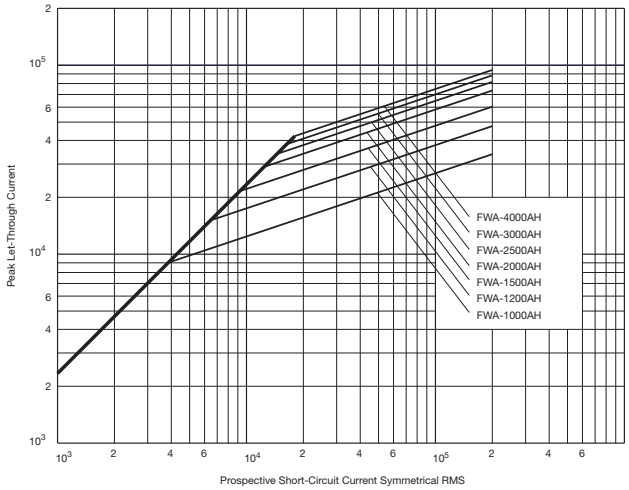
# North American — FWA 130V: 1000-4000A

## FWA 1000-4000A: 130V

### Time-Current Curve




### Peak Let-Through Curve




**Data Sheet: 35785301**

# North American — FWA 150V: 70-1000A

## FWA


### Specifications

**Description:** North American style stud-mount fuses.

**Dimensions:** See Dimensions illustrations.

**Ratings:**

Volts: — 150Vac/dc*

Amps: — 70-1000A

IR: — 100kA Sym. (70-400A)

— 200kA Sym. (450-1000A)

— 20kA @150Vdc (70-800A)

— 100kA @ 80Vdc (70-1000A)

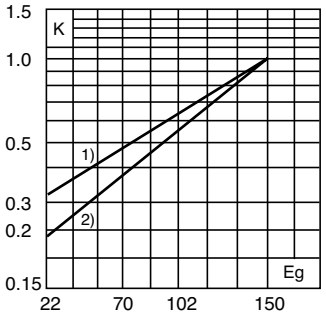
*1000A rated @ 80Vdc.

**Agency Information:** CE, UL Recognized JFHR2.E91958

### Electrical Characteristics

#### Total Clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, $E_g$, (rms).




1) 500-1000A Range
2) 70-400A Range

### Dimensions - in

Fig. 1: 70-400A

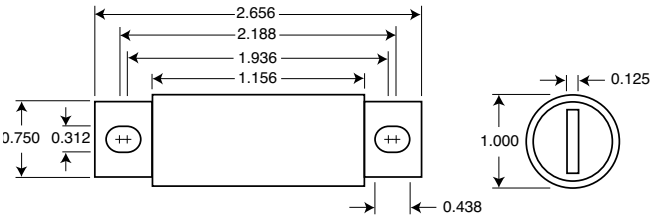
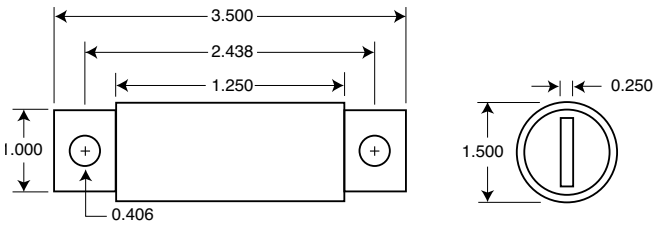


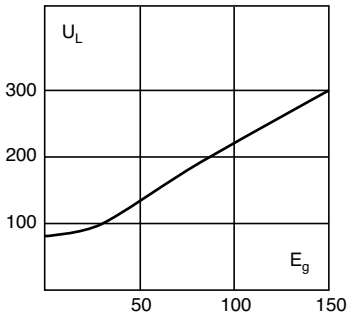

Fig. 2: 500-1000A




1mm = 0.0394" / 1" = 25.4mm

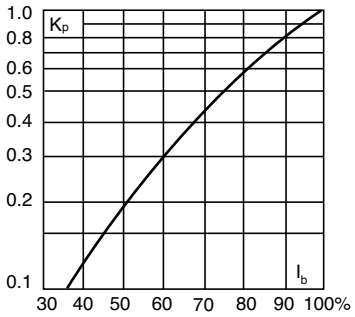
### Arc Voltage

This curve gives the peak arc voltage, $U_L$, which may appear across the fuse during its operation as a function of the applied working voltage, $E_g$, (rms) at a power factor of 15%.




### Power Losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, $K_p$, is given as a function of the RMS load current, $I_b$, in % of the rated current.




### Catalog Numbers

| Catalog Number | Electrical Characteristics: Rated Current RMS-Amps | I²t (A² Sec): Pre-arc | I²t (A² Sec): Clearing at 150V | Watts Loss |
|---|---|---|---|---|
| FWA-70B | 70 | 470 | 4000 | 6.9 |
| FWA-80B | 80 | 670 | 6000 | 7.7 |
| FWA-100B | 100 | 1200 | 12000 | 9.0 |
| FWA-125B | 125 | 1870 | 18000 | 11.2 |
| FWA-150B | 150 | 2700 | 26000 | 13.5 |
| FWA-200B | 200 | 4780 | 45000 | 17.6 |
| FWA-250B | 250 | 7470 | 70000 | 22.5 |
| FWA-300B | 300 | 10760 | 100000 | 27.0 |
| FWA-350B | 350 | 15700 | 140000 | 30.6 |
| FWA-400B | 400 | 20300 | 180000 | 35.2 |
| FWA-500A | 500 | 39000 | 120000 | 35.0 |
| FWA-600A | 600 | 46000 | 140000 | 47.0 |
| FWA-700A | 700 | 75000 | 220000 | 49.0 |
| FWA-800A | 800 | 92000 | 280000 | 58.0 |
| FWA-1000A | 1000 | 170000 | 510000 | 60.0 |

• Watts loss provided at rated current.
• See accessories on page 141.

### Features and Benefits

- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Low watts loss
- Superior cycling capability

### Typical Applications

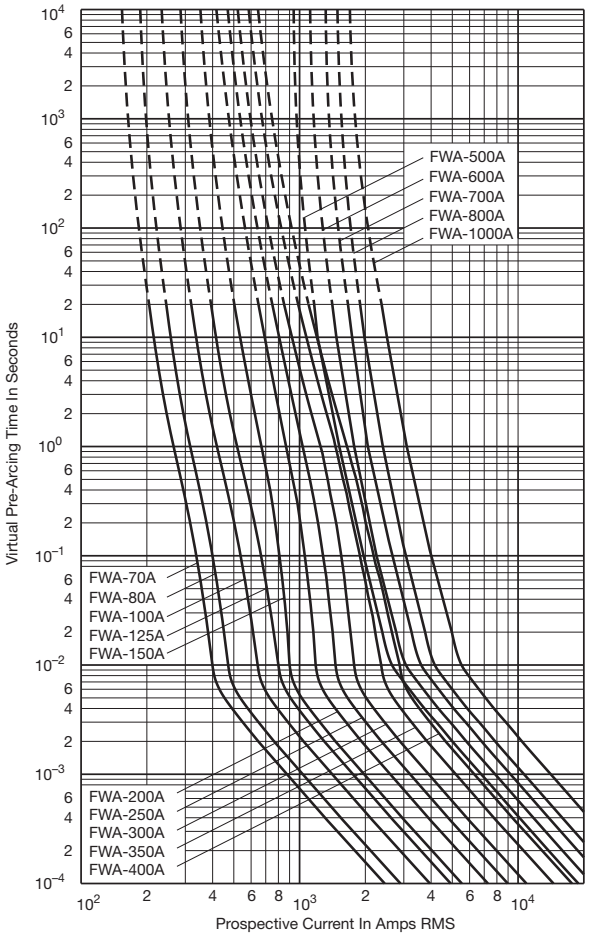
- DC Common bus
- DC Drives
- Power converters/rectifiers
- Reduced voltage starters

**Data Sheet: 720002**

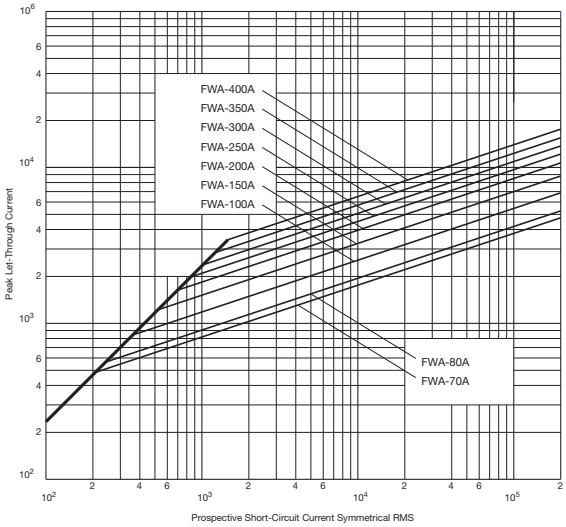
# North American — FWA 150V: 70-1000A

## FWA 70-1000A: 150V

### Time-Current Curve




### Peak Let-Through Curve




**Data Sheet: 35785310**

# North American — FWX 250V: 35-2500A

## FWX


### Specifications

**Description:** North American style stud-mount and flush-end fuses.

**Dimensions:** See Dimensions illustrations.

**Ratings:**

Volts: — 250Vac/dc

Amps: — 35-2500A

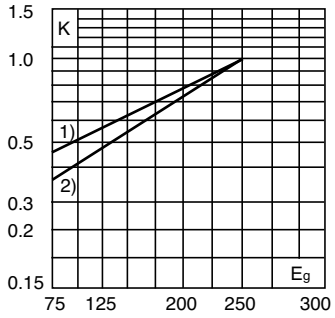
IR: — 200kA RMS Sym.
50kA@250Vdc (35-800A)

**Agency Information:** CE, UL Recognized JFHR2.E56412 & CSA Component Acceptance file Class 1422-30, (53787) on 35-800A fuses (50kA IR @250Vdc).

### Electrical Characteristics

#### Total Clearing $I^2t$

The total clearing $I^2t$ at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing $I^2t$ is found by multiplying by correction factor, K, given as a function of applied working voltage, $E_g$, (rms).




1) 35-800A Range
2) 1000-2500A Range

### Dimensions - in

| Amp Range | Fig. | A | B | C | D | E | F | G | H | J | Tapped Thread Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35-60 | 1 | 3.19 | 0.81 | 1.59 | 2.59 | 2.25 | 0.34 | 0.63 | 0.13 | 0.52 | — |
| 70-200 | 1 | 3.13 | 1.22 | 1.59 | 2.44 | 2.19 | 0.34 | 1.00 | 0.19 | 0.47 | — |
| 225-600 | 1 | 3.84 | 1.50 | 1.59 | 2.94 | 2.25 | 0.41 | 1.00 | 0.25 | 0.75 | — |
| 700-800 | 1 | 3.84 | 2.00 | 1.59 | 3.03 | 2.28 | 0.41 | 1.50 | 0.25 | 0.78 | — |
| 1000-1200 | 2 | 2.59 | 3.00 | 1.50 | — | — | — | — | — | — | ⅜"-24 x ½" |
| 1500-2500 | 3 | 2.59 | 3.50 | 1.50 | 1.50 | — | — | — | — | — | ⅜"--24 x ½" |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 35-800A

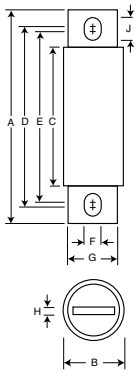



Fig. 2: 1000-1200A

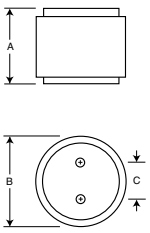
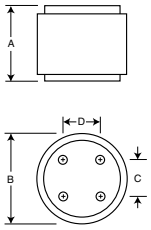
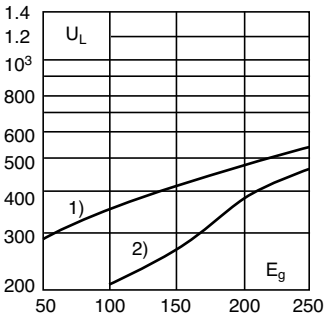



Fig. 3: 1500-2500A




### Arc Voltage

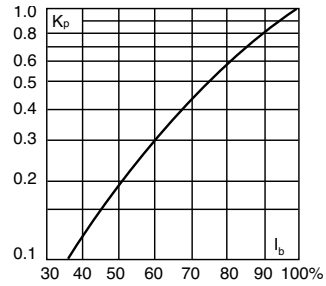
This curve gives the peak arc voltage, $U_L$, which may appear across the fuse during its operation as a function of the applied working voltage, $E_g$, (rms) at a power factor of 15%.




1) 35-800A Range
2) 1000-2500A Range

### Power Losses

Watts loss at rated current is given in the electrical char acteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, $K_p$, is given as a function of the RMS load current, $I_b$, in % of the rated current.




### Catalog Numbers

| Catalog Number | Electrical Characteristics: Rated Current RMS-Amps | $I^2t$ ($A^2$ Sec): Pre-arc | $I^2t$ ($A^2$ Sec): Clearing at 250V | Watts Loss |
|---|---|---|---|---|
| FWX-35A | 35 | 50 | 230 | 4.2 |
| FWX-40A | 40 | 60 | 310 | 5.2 |
| FWX-45A | 45 | 80 | 390 | 5.7 |
| FWX-50A | 50 | 100 | 520 | 6.0 |
| FWX-60A | 60 | 140 | 740 | 8.1 |
| FWX-70A | 70 | 330 | 1400 | 7.2 |
| FWX-80A | 80 | 430 | 1850 | 8.1 |
| FWX-90A | 90 | 570 | 2450 | 9.0 |
| FWX-100A | 100 | 740 | 3150 | 10.0 |
| FWX-125A | 125 | 1130 | 4850 | 12.5 |
| FWX-150A | 150 | 1620 | 6950 | 15.7 |
| FWX-175A | 175 | 2170 | 9300 | 18.5 |
| FWX-200A | 200 | 2790 | 12000 | 22 |
| FWX-225A | 225 | 3210 | 14700 | 24 |
| FWX-250A | 250 | 3960 | 18100 | 27 |
| FWX-275A | 275 | 4720 | 21600 | 31 |
| FWX-300A | 300 | 6000 | 27300 | 32 |
| FWX-350A | 350 | 10600 | 48600 | 39 |
| FWX-400A | 400 | 14500 | 66100 | 44 |
| FWX-450A | 450 | 22100 | 101000 | 49 |
| FWX-500A | 500 | 28000 | 128000 | 54 |
| FWX-600A | 600 | 41100 | 188000 | 62 |
| FWX-700A | 700 | 48800 | 190000 | 72 |
| FWX-800A | 800 | 59000 | 230000 | 84 |
| FWX-1000AH | 1000 | 44000 | 360000 | 100 |
| FWX-1200AH | 1200 | 92000 | 750000 | 103 |
| FWX-1500AH | 1500 | 120000 | 880000 | 140 |
| FWX-1600AH | 1600 | 160000 | 1200000 | 140 |
| FWX-2000AH | 2000 | 320000 | 2300000 | 151 |
| FWX-2500AH | 2500 | 670000 | 4700000 | 163 |

• Watts loss provided at rated current. • See accessories on page 141.

### Features and Benefits

- Excellent DC performance
- Low arc voltage and low energy let-through ($I^2t$)
- Superior cycling capability

### Typical Applications

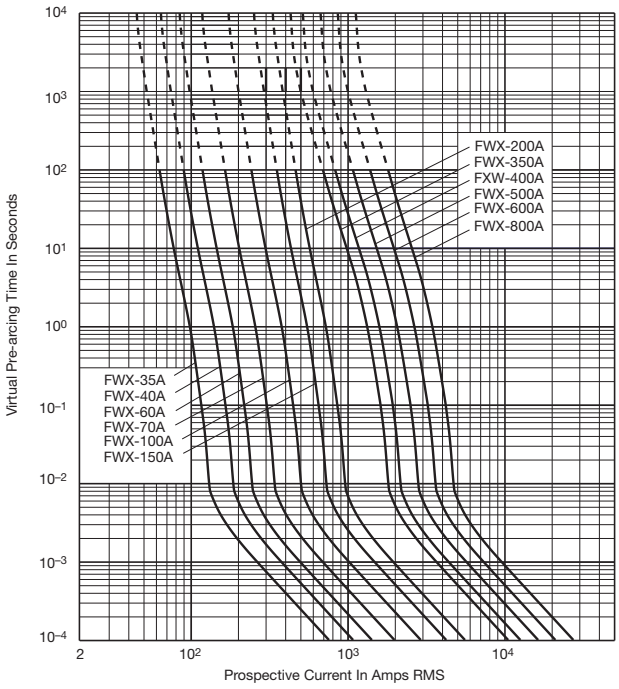
- DC Common bus
- DC Drives
- Power converters/rectifiers
- Reduced voltage starters

**Data Sheet: 720005**

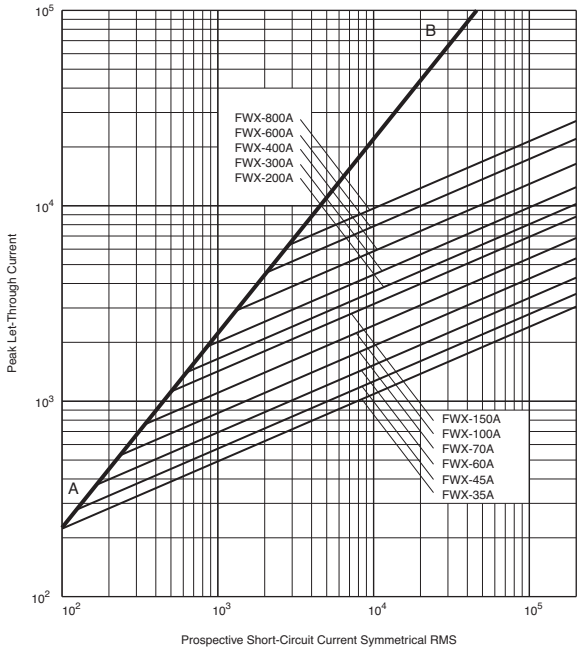
# North American — FWX 250V: 35-2500A

## FWX 35-800A: 250V

### Time-Current Curve



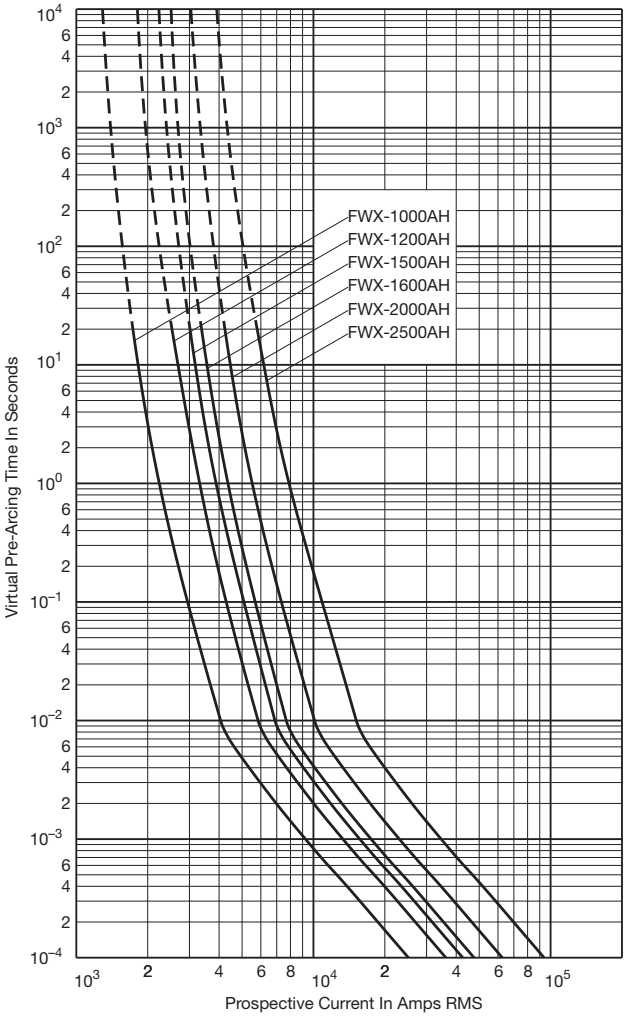

### Peak Let-Through Curve



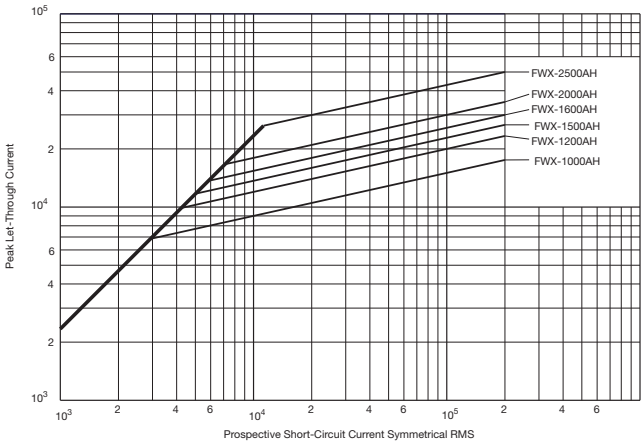

**Data Sheet: 359**

## FWX 1000-2500A(H): 250V

### Time-Current Curve




### Peak Let-Through Curve




**Data Sheet: 35785299**

# North American — FWH 500V: 35-1600A

## FWH

### Specifications

**Description:** North American style stud-mount fuses.

**Dimensions:** See Dimensions illustration.

**Ratings:**

Volts: — 500Vac/dc (35-800A only)

Amps: — 35-1600A

IR: — 200kA Sym.

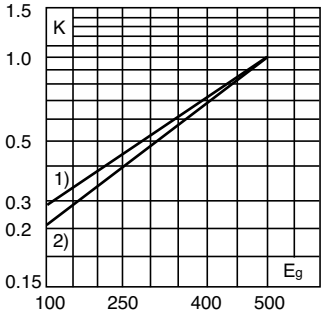
— 50kA @ 500Vdc (35-800A)

**Agency Information:** CE, UL Recognition JFHR2.E91958 FWH-_B (35-200A, 1000-1200A), JFHR2.E56412 FWH-_A (225-600A), CSA Component Acceptance Class 1422-30, File 53787 (35-1600A).

### Electrical Characteristics

#### Total Clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, $E_g$, (rms).




1) 35-800A Range
2) 1000-1600A Range

### Dimensions - in

| Amp Range | Fig. | A | B | C | D | E | F | G | H | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 35-60 | 1 | 3.188 | 0.813 | 1.593 | 2.541 | 2.193 | 0.344 | 0.719 | 0.125 | 0.518 |
| 70-100 | 1 | 3.625 | 0.947 | 1.736 | 2.853 | 2.807 | 0.352 | 0.750 | 0.125 | 0.375 |
| 125-200 | 1 | 3.625 | 1.156 | 1.836 | 2.892 | 2.768 | 0.344 | 1.000 | 0.188 | 0.406 |
| 225-400 | 1 | 4.340 | 1.500 | 2.090 | 3.440 | 2.750 | 0.410 | 1.000 | 0.250 | 0.750 |
| 450-600 | 1 | 4.340 | 2.000 | 2.090 | 3.530 | 2.780 | 0.410 | 1.500 | 0.250 | 0.780 |
| 700-800 | 1 | 6.340 | 2.500 | 2.090 | 4.970 | 3.440 | 0.530 | 2.000 | 0.380 | 1.300 |
| 1000-1200 | 1 | 6.969 | 3.000 | 3.219 | 5.465 | 4.475 | 0.625 | 2.375 | 0.438 | 1.120 |
| 1400-1600 | 2 | See Drawing | | | | | | | | |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 35-1200A

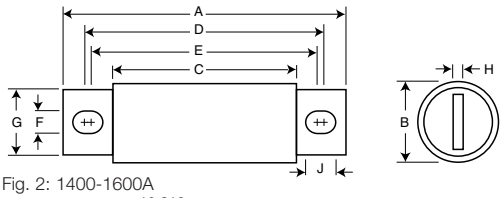
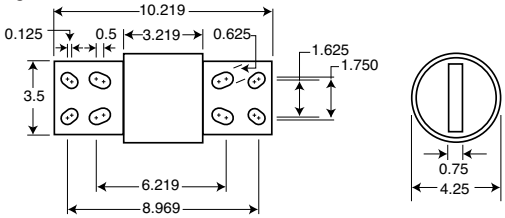
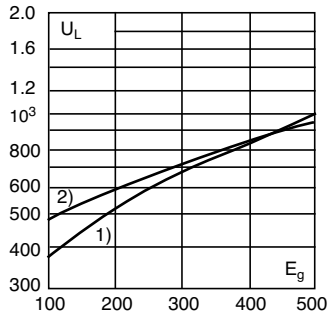



Fig. 2: 1400-1600A




### Arc Voltage

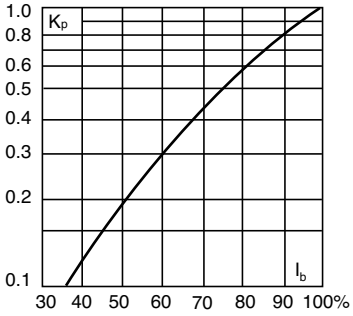
This curve gives the peak arc voltage, $U_L$, which may appear across the fuse during its operation as a function of theapplied working voltage, $E_g$, (rms) at a power factor of 15%.




1) 35-200 & 1000-1600A Range
2) 225-800A Range

### Power Losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, $K_p$, is given as a function of the RMS load current, Ib, in % of the rated current.




### Catalog Numbers

| Catalog Numbers | Electrical Characteristics: Rated Current RMS-Amps | I²t (A² Sec): Pre-arc | I²t (A² Sec): Clearing at 500V | Watts Loss |
|---|---|---|---|---|
| FWH-35B | 35 | 34 | 150 | 8 |
| FWH-40B | 40 | 76 | 320 | 7.5 |
| FWH-45B | 45 | 105 | 450 | 7.5 |
| FWH-50B | 50 | 135 | 670 | 7.5 |
| FWH-60B | 60 | 210 | 900 | 9.9 |
| FWH-70B | 70 | 210 | 900 | 10.6 |
| FWH-80B | 80 | 305 | 1400 | 12.7 |
| FWH-90B | 90 | 360 | 1600 | 15 |
| FWH-100B | 100 | 475 | 2000 | 17 |
| FWH-125B | 125 | 800 | 3500 | 25 |
| FWH-150B | 150 | 1100 | 4600 | 30 |
| FWH-175B | 175 | 1450 | 6200 | 35 |
| FWH-200B | 200 | 1900 | 8500 | 40 |
| FWH-225A | 225 | 4600 | 23300 | 39 |
| FWH-250A | 250 | 6300 | 32200 | 41 |
| FWH-275A | 275 | 7900 | 40300 | 46 |
| FWH-300A | 300 | 9800 | 49800 | 51 |
| FWH-325A | 325 | 13700 | 63800 | 53 |
| FWH-350A | 350 | 14500 | 72900 | 58 |
| FWH-400A | 400 | 19200 | 96700 | 65 |
| FWH-450A | 450 | 24700 | 127000 | 74 |
| FWH-500A | 500 | 29200 | 149000 | 84 |
| FWH-600A | 600 | 41300 | 206000 | 108 |
| FWH-700A | 700 | 55000 | 298000 | 120 |
| FWH-800A | 800 | 76200 | 409000 | 129 |
| FWH-1000A | 1000 | 92000 | 450000 | 145 |
| FWH-1200A | 1200 | 122000 | 600000 | 180 |
| FWH-1400A | 1400 | 200000 | 1000000 | 210 |
| FWH-1600A | 1600 | 290000 | 1400000 | 230 |

• Watts loss provided at rated current. • See accessories on page 141.

### Features and Benefits

- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Superior cycling capability

### Typical Applications

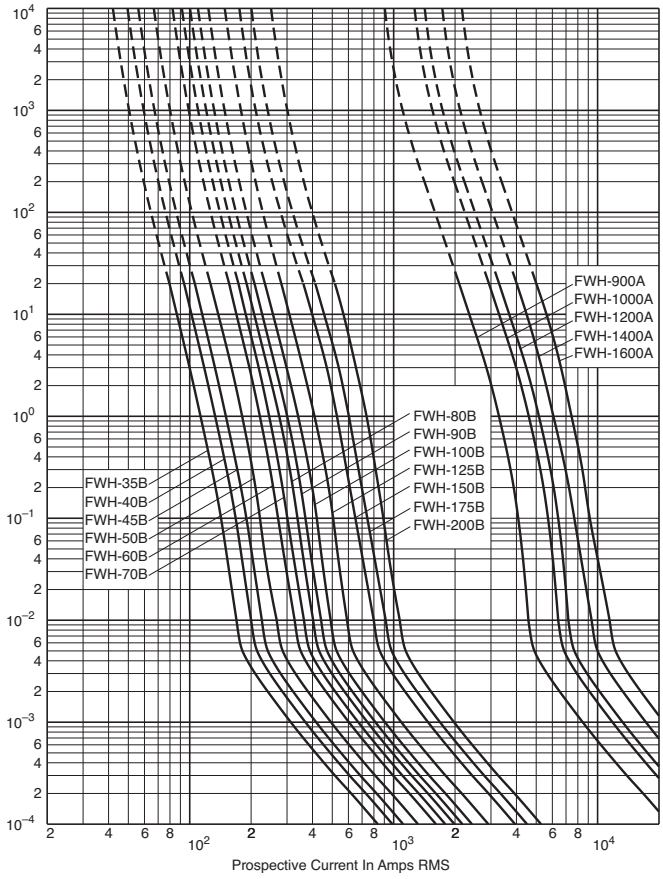
- DC Common bus
- DC Drives
- Power converters/rectifiers
- Reduced voltage starters

**Data Sheet: 720007**

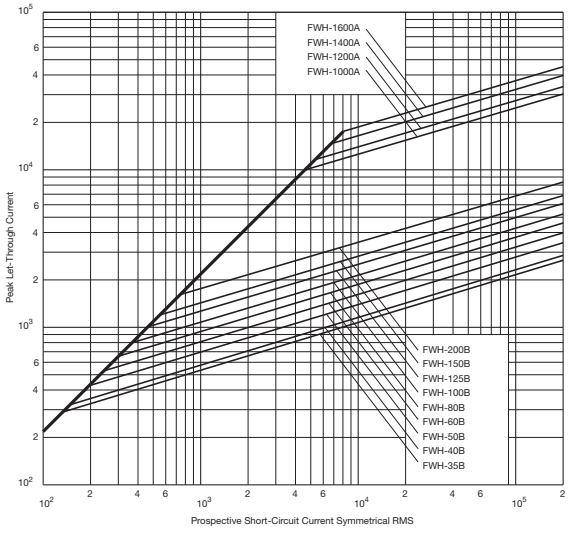
# North American — FWH 500V: 35-1600A

## FWH 35-200A(B) & 900-1600A(A): 500V

### Time-Current Curve



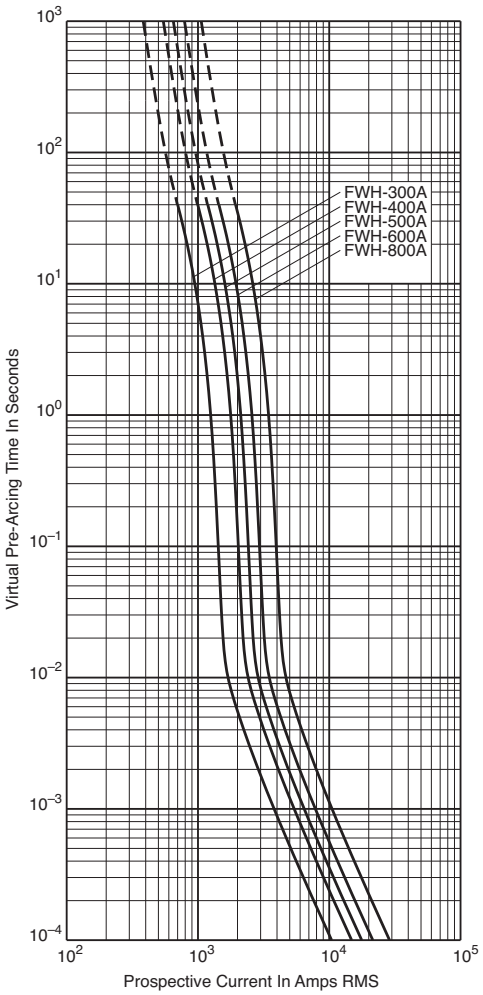

### Peak Let-Through Curve



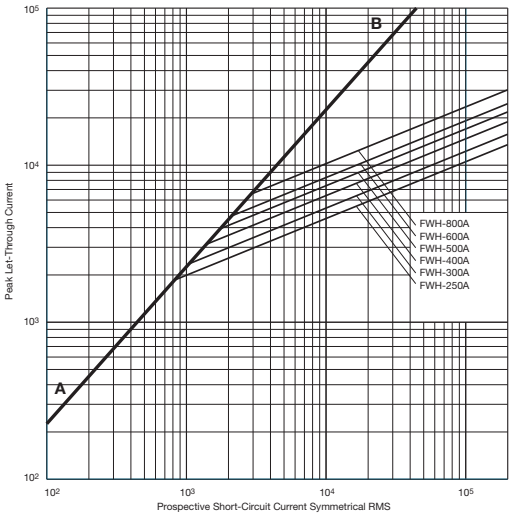

**Data Sheet: 35785304**

## FWH 250-800A: 500V

### Time-Current Curve




### Peak Let-Through Curve




**Data Sheet: 360**

# North American — KAC 600V: 1-1000A

## KAC

**Specifications**

**Description:** North American style stud-mount fuses. These 600V fuses are supplied as replacements only. For new installations, Bussmann recommends the 700V FWP Series fuse.

**Dimensions:** See Dimensions illustrations.

**Ratings:**

Volts: — 600Vac

Amps: — 1-1000A

IR: — 200kA RMS Sym.

**Agency Information:** CE, UL Recognition JFHR2.E56413 on 1-600A only.


**Catalog Numbers (Amps)**

| | | |
|---|---|---|
| KAC-1 | KAC-25 | KAC-175 |
| KAC-2 | KAC-30 | KAC-200 |
| KAC-3 | KAC-35 | KAC-225 |
| KAC-4 | KAC-40 | KAC-250 |
| KAC-5 | KAC-45 | KAC-300 |
| KAC-6 | KAC-50 | KAC-350 |
| KAC-7 | KAC-60 | KAC-400 |
| KAC-8 | KAC-70 | KAC-450 |
| KAC-9 | KAC-80 | KAC-500 |
| KAC-10 | KAC-90 | KAC-600 |
| KAC-12 | KAC-100 | KAC-700 |
| KAC-15 | KAC-110 | KAC-800 |
| KAC-17.5 | KAC-125 | KAC-1000 |
| KAC-20 | KAC-150 | |

• See accessories on page 141.

**Features and Benefits**

- Low arc voltage and low energy let-through ($I^2t$)
- Low watts loss
- Superior cycling capability

**Typical Applications**

- Power converters/rectifiers
- Reduced voltage starters

**Dimensions - in**

| Amp Range | Fig. | A | B1 | B2 | B3 | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-30A | 1 | 2.875 | 2.500 | – | – | 1.875 | 0.406 | – | 0.563 | 0.063 | 0.257 |
| 35-60A | 2 | 4.375 | – | 3.750 | 3.500 | 2.750 | 0.625 | 0.343 | 0.813 | 0.094 | 0.468 |
| 70-100A | 2 | 5.000 | – | 4.063 | 3.656 | 2.750 | 0.750 | 0.406 | 1.000 | 0.125 | 0.609 |
| 110-200A | 2 | 5.140 | – | 4.390 | 3.766 | 2.906 | 1.000 | 0.406 | 1.500 | 0.188 | 0.718 |
| 225-400A | 2 | 6.182 | – | 4.815 | 4.565 | 3.000 | 1.625 | 0.562 | 2.000 | 0.250 | 0.687 |
| 450-800A | 1 | 6.250 | 4.750 | – | – | 3.063 | 2.000 | – | 2.500 | 0.250 | 0.563 |
| 1000A | 1 | 7.250 | 4.750 | – | – | 3.063 | 2.750 | – | 3.500 | 0.375 | 0.563 |

1mm = 0.0394″ / 1″ = 25.4mm

Fig. 1: 1-30 & 450-1000A

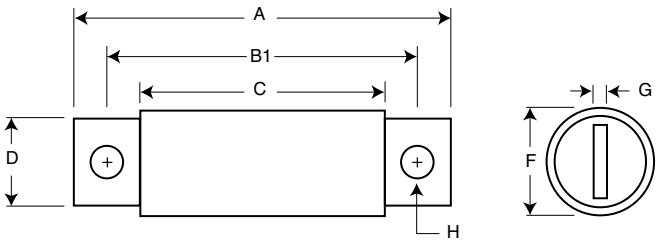
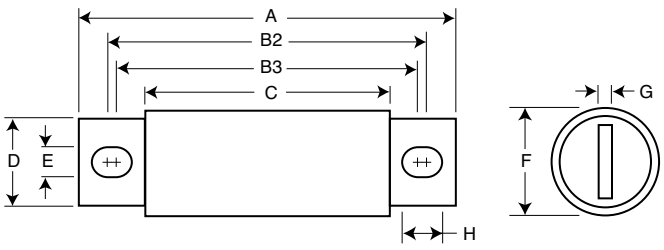



Fig. 2: 35-400A




**Data Sheet: 720009**

# North American — KBC 600V: 35-800A

## KBC


**Specifications**

**Description:** North American style stud-mount and flush-end fuses. These 600V fuses are supplied as replacements only. For new installations, Bussmann recommends the 700V FWP Series fuse.

**Dimensions:** See Dimensions illustrations.

**Ratings:**

Volts: — 600Vac

Amps: — 35-800A

IR: — 200kA RMS Sym.

**Agency Information:** CE, UL Recognition JFHR2.E56412 on 35-600A only.

**Catalog Numbers (Amps)**

| | | |
|---|---|---|
| KBC-35 | KBC-100 | KBC-300 |
| KBC-40 | KBC-110 | KBC-350 |
| KBC-45 | KBC-125 | KBC-400 |
| KBC-50 | KBC-150 | KBC-450 |
| KBC-60 | KBC-175 | KBC-500 |
| KBC-70 | KBC-200 | KBC-600 |
| KBC-80 | KBC-225 | KBC-800 |
| KBC-90 | KBC-250 | |

• See accessories on page 141.

**Features and Benefits**

- Low arc voltage and low energy let-through ($I^2t$)
- Low watts loss
- Superior cycling capability

**Typical Applications**

- Power converters/rectifiers
- Reduced voltage starters

**Dimensions - in**

| Amp Range | Fig. | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|---|
| 35-60A | 1 | 4.375 | 3.750 | 3.500 | 2.750 | 0.343 | 0.625 | 0.813 | 0.094 | 0.468 |
| 70-100A | 2 | See Drawing | | | | | | | | |
| 110-200A | 1 | 4.406 | 3.719 | 3.594 | 2.906 | 0.312 | 0.875 | 1.219 | 0.187 | 0.375 |
| 225-400A | 1 | 5.125 | 4.188 | 3.563 | 2.906 | 0.406 | 1.000 | 1.500 | 0.250 | 0.719 |
| 450-600A | 1 | 5.125 | 4.389 | 3.687 | 2.875 | 0.406 | 1.500 | 2.000 | 0.250 | 0.757 |
| 800A | 3 | See Drawing | | | | | | | | |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 35-60 and 110-600A

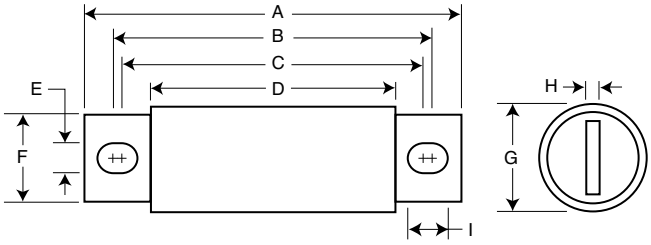



Fig. 2: 70-100A

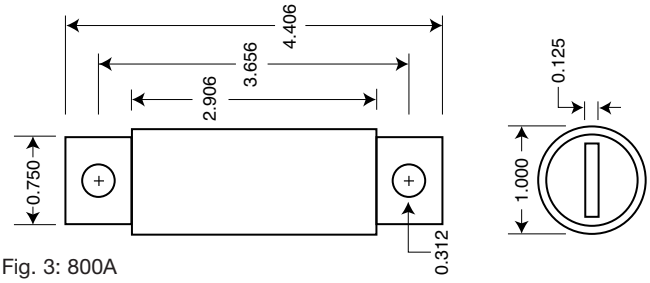
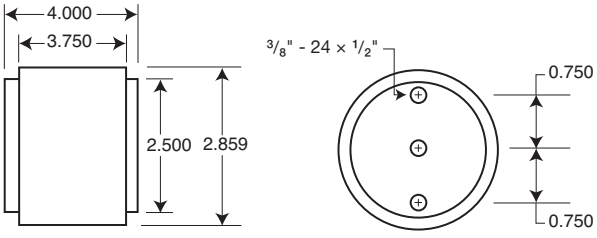



Fig. 3: 800A




**Data Sheet: 720010**

# North American — FWP 700V: 5-1200A

## FWP


### Specifications

**Description:** North American style stud-mount fuses.

**Dimensions:** See Dimensions illustrations.

**Ratings:**

Volts: — 700Vac/dc

Amps: — 5-1200A

IR: — 200kA RMS Sym.

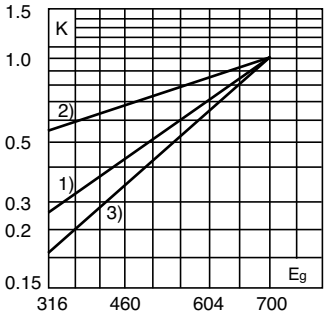
— 50kA @700Vdc

**Agency Information:** CE, UL Recognition JFHR2.E91958 FWP-_B (5-100A, 700-1200A), JFHR2.E56412 FWP-_A (125-600A) & CSA Component Acceptance file Class 1422-30, (53787) on 5-800A

### Electrical Characteristics

### Total Clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, $E_g$, (rms).




1) 35-100A Range
2) 125-600A Range
3) 700-1200A Range

### Dimensions - in

| Amp Range | Fig. | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-30 | 1 | 2.870 | 0.563 | 1.855 | 2.477 | 2.477 | 0.250 | 0.405 | 0.063 | 0.250 |
| 35-60 | 1 | 4.375 | 0.813 | 2.750 | 3.708 | 3.312 | 0.344 | 0.725 | 0.125 | 0.542 |
| 70-100 | 1 | 4.406 | 0.947 | 2.594 | 3.625 | 3.563 | 0.344 | 0.750 | 0.125 | 0.375 |
| 125-200 | 1 | 5.090 | 1.500 | 2.840 | 4.190 | 3.500 | 0.410 | 1.000 | 0.250 | 0.750 |
| 225-400 | 1 | 5.090 | 2.000 | 2.840 | 4.280 | 3.530 | 0.410 | 1.500 | 0.250 | 0.780 |
| 450-600 | 1 | 7.090 | 2.500 | 2.840 | 5.720 | 4.190 | 0.530 | 2.000 | 0.380 | 1.300 |
| 700-800 | 1 | 6.630 | 2.000 | 2.844 | 5.562 | 5.062 | 0.625 | 1.500 | 0.250 | 0.875 |
| 900-1000 | 2 | See Drawing | | | | | | | | |
| 1200 | 3 | See Drawing | | | | | | | | |

1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 5-800A

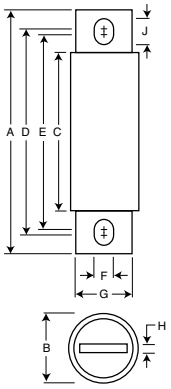



Fig. 2: 900-1000A

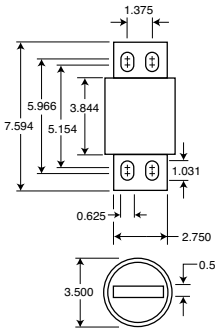
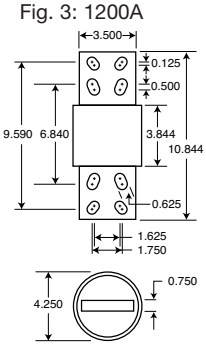
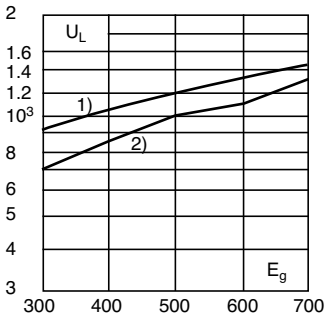



Fig. 3: 1200A




### Arc Voltage

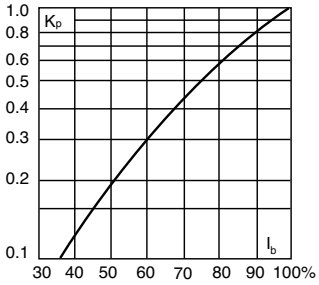
This curve gives the peak arc voltage, $U_L$, which may appear across the fuse during its operation as a function of the applied working voltage, $E_g$, (rms) at a power factor of 15%.




1) 125-600A Range
2) 35-100 & 700-1200A Range

### Power Losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, $K_p$, is given as a function of the RMS load current, $I_b$, in % of the rated current.




### Catalog Numbers

| Catalog Numbers | Electrical Characteristics: Rated Current RMS-Amps | I²t (A² Sec): Pre-arc | I²t (A² Sec): Clearing at 700V | Watts Loss |
|---|---|---|---|---|
| FWP-5B | 5 | 1.6 | 10 | 1.5 |
| FWP-10B | 10 | 3.6 | 20 | 4 |
| FWP-15B | 15 | 10 | 75 | 5.5 |
| FWP-20B | 20 | 26 | 180 | 6 |
| FWP-25B | 25 | 44 | 340 | 7 |
| FWP-30B | 30 | 58 | 450 | 9 |
| FWP-35B | 35 | 34 | 160 | 12 |
| FWP-40B | 40 | 76 | 320 | 12 |
| FWP-50B | 50 | 135 | 600 | 12 |
| FWP-60B | 60 | 210 | 950 | 15.5 |
| FWP-70B | 70 | 305 | 2000 | 18 |
| FWP-80B | 80 | 360 | 2400 | 21 |
| FWP-90B | 90 | 415 | 2700 | 25 |
| FWP-100B | 100 | 540 | 3500 | 27 |
| FWP-125A | 125 | 1800 | 7300 | 28 |
| FWP-150A | 150 | 2900 | 11700 | 32 |
| FWP-175A | 175 | 4200 | 16700 | 35 |
| FWP-200A | 200 | 5500 | 22000 | 43 |
| FWP-225A | 225 | 7700 | 31300 | 45 |
| FWP-250A | 250 | 10500 | 42500 | 48 |
| FWP-300A | 300 | 17600 | 71200 | 58 |
| FWP-350A | 350 | 23700 | 95600 | 65 |
| FWP-400A | 400 | 31000 | 125000 | 78 |
| FWP-450A | 450 | 36400 | 137000 | 94 |
| FWP-500A | 500 | 45200 | 170000 | 107 |
| FWP-600A | 600 | 66700 | 250000 | 122 |
| FWP-700A | 700 | 54000 | 300000 | 125 |
| FWP-800A | 800 | 78000 | 450000 | 140 |
| FWP-900A | 900 | 91500 | 530000 | 150 |
| FWP-1000A | 1000 | 120000 | 600000 | 170 |
| FWP-1200A | 1200 | 195000 | 1100000 | 190 |

• Watts loss provided at rated current. • See accessories on page 141.

### Features and Benefits

- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Superior cycling capability

### Typical Applications

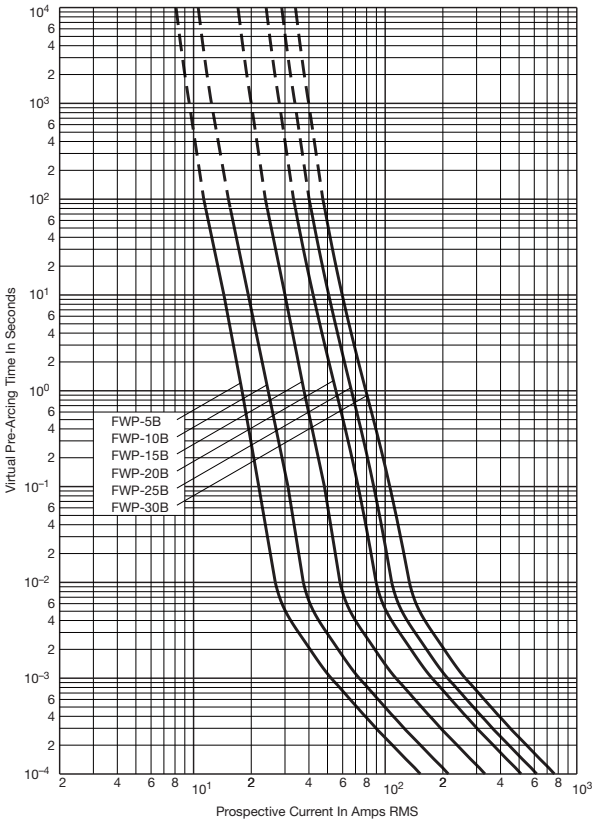
- DC Common bus
- DC Drives
- Power converters/rectifiers
- Reduced voltage starters

**Data Sheet: 720012**

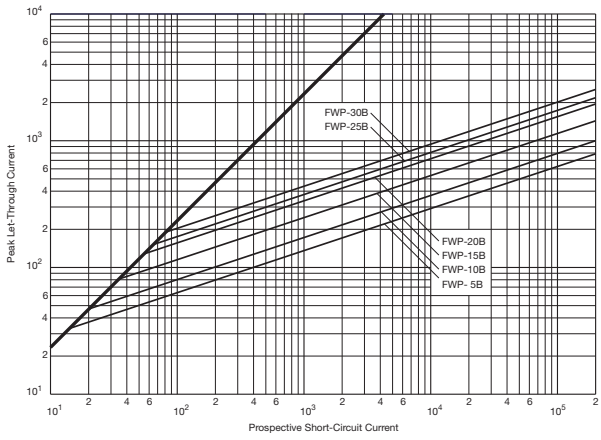
# North American — FWP 700V: 5-1200A

## FWP 5-30A(B): 700V

### Time-Current Curve



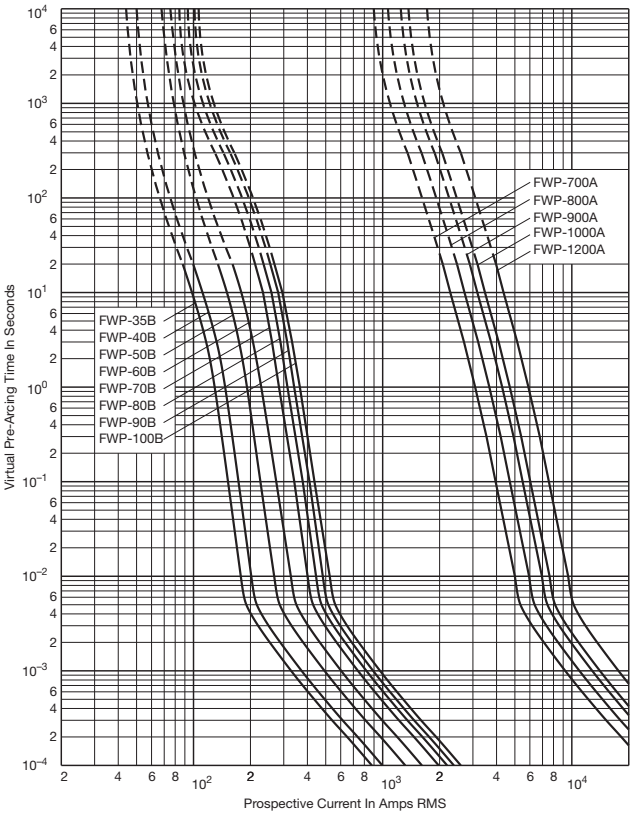

### Peak Let-Through Curve



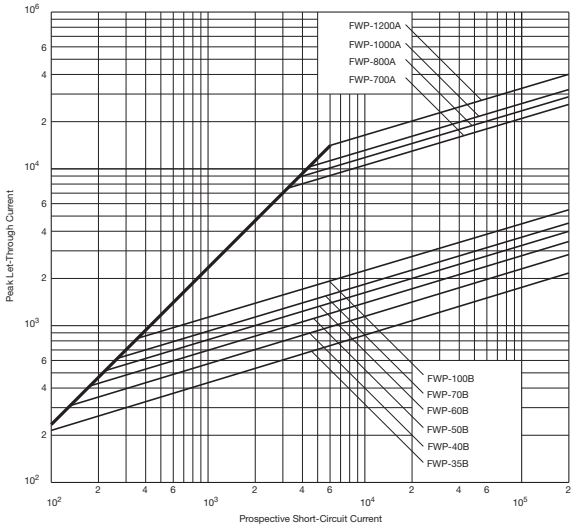

**Data Sheet: 35785316**

## FWP 35-100A(B) & 700-1200A(A): 700V

### Time-Current Curve




### Peak Let-Through Curve

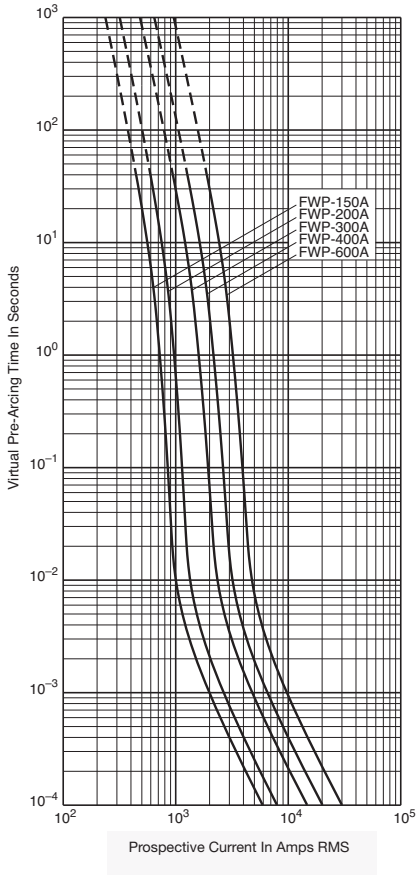



**Data Sheet: 35785308**

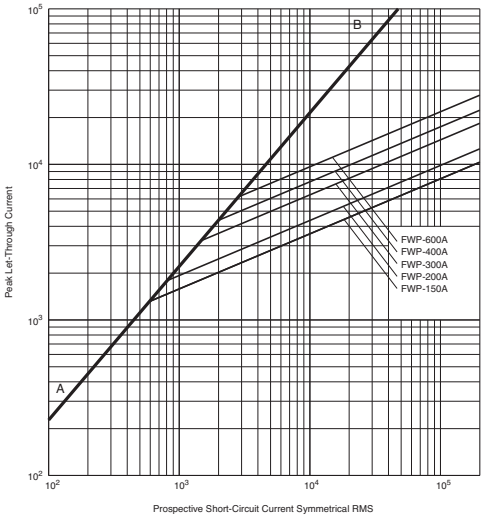
# North American — FWP 700V: 5-1200A

## FWP 150-600A: 700V

### Time-Current Curve




### Peak Let-Through Curve




**Data Sheet: 361**

# North American — FWJ 1000V: 35-2000A

## FWJ


### Specifications

**Description:** North American style stud-mount fuses.

**Dimensions:** See Dimensions illustration.

**Ratings:**

Volts: — 1000Vac/800Vdc

Amps: — 35-2000A

IR: — 25kA (35-200A)

— 100kA (250-2000A)

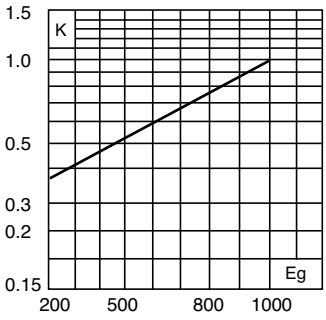
— 50kA @ 800Vdc (35-200A, 450-600A)

**Agency Information:** CE, UL Recognition JFHR8.E91958 on 35-600A only.

### Electrical Characteristics

#### Total Clearing I²t

The total clearing I²t at rated voltage and at power factor of 15% are given in the electrical characteristics. For other voltages, the clearing I²t is found by multiplying by correction factor, K, given as a function of applied working voltage, $E_g$, (rms).

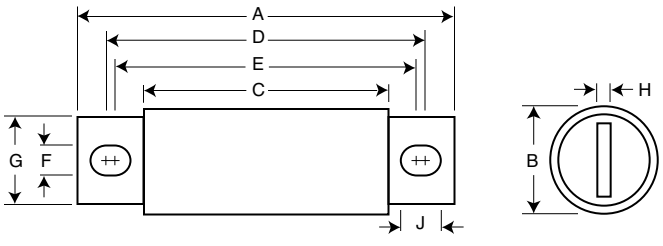



### Dimensions - in

| Amp Range | Fig. | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|---|
| 35-60 | 1 | 5.000 | 0.940 | 3.110 | 4.235 | 4.180 | 0.352 | 0.750 | 0.125 | 0.380 |
| 70-100 | 1 | 4.932 | 1.125 | 3.085 | 4.266 | 4.156 | 0.352 | 1.000 | 0.188 | 0.407 |
| 125-200 | 1 | 5.685 | 1.526 | 3.261 | 4.803 | 4.055 | 0.445 | 1.000 | 0.250 | 0.819 |
| 250-400 | 1 | 5.768 | 2.000 | 3.500 | 4.811 | 4.150 | 0.433 | 1.500 | 0.250 | 0.764 |
| 500-600 | 1 | 7.201 | 2.500 | 3.465 | 5.984 | 4.706 | 0.562 | 2.000 | 0.375 | 1.201 |
| 800-2000 | 1 | 6.811 | 3.500 | 3.312 | 5.472 | 4.962 | 0.625 | 2.750 | 0.500 | 0.880 |

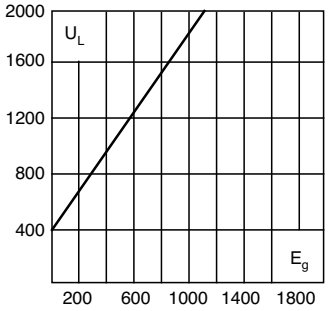
1mm = 0.0394" / 1" = 25.4mm

Fig. 1: 35-2000A



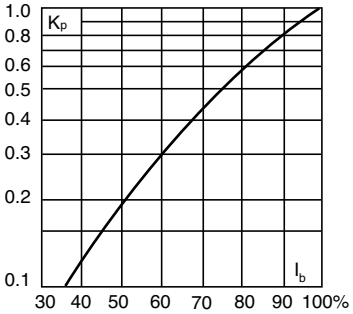

### Arc Voltage

This curve gives the peak arc voltage, $U_L$, which may appear across the fuse during its operation as a function of the applied working voltage, $E_g$, (rms) at a power factor of 15%.




### Power Losses

Watts loss at rated current is given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated current. The correction factor, $K_p$, is given as a function of the RMS load current, $I_b$, in % of the rated current.




### Catalog Numbers

| Catalog Numbers | Electrical Characteristics: Rated Current RMS-Amps | I2t (A2 Sec): Pre-arc | I2t (A2 Sec): Clearing at 1000V | Watts Loss |
|---|---|---|---|---|
| FWJ-35A | 35 | 210 | 2000 | 7 |
| FWJ-40A | 40 | 300 | 2500 | 8 |
| FWJ-50A | 50 | 470 | 3500 | 10 |
| FWJ-60A | 60 | 670 | 5000 | 11 |
| FWJ-70A | 70 | 1100 | 6900 | 12 |
| FWJ-80A | 80 | 1550 | 9700 | 13 |
| FWJ-90A | 90 | 1900 | 12000 | 14 |
| FWJ-100A | 100 | 2800 | 17500 | 15 |
| FWJ-125A | 125 | 4800 | 35000 | 16 |
| FWJ-150A | 150 | 6300 | 45000 | 25 |
| FWJ-175A | 175 | 7500 | 65000 | 30 |
| FWJ-200A | 200 | 11700 | 80000 | 32 |
| FWJ-250A | 250 | 16000 | 112000 | 50 |
| FWJ-300A | 300 | 23500 | 164000 | 56 |
| FWJ-350A | 350 | 33000 | 231000 | 62 |
| FWJ-400A | 400 | 47000 | 330000 | 67 |
| FWJ-500A | 500 | 39500 | 329000 | 95 |
| FWJ-600A | 600 | 61000 | 520000 | 105 |
| FWJ-800A | 800 | 87000 | 500000 | 182 |
| FWJ-1000A | 1000 | 190000 | 1100000 | 206 |
| FWJ-1200A | 1200 | 370000 | 2100000 | 240 |
| FWJ-1400A | 1400 | 470000 | 2700000 | 248 |
| FWJ-1600A | 1600 | 700000 | 4000000 | 267 |
| FWJ-1800A | 1800 | 925000 | 5300000 | 239 |
| FWJ-2000A | 2000 | 1330000 | 7600000 | 244 |

• Watts loss provided at rated current.

• See accessories on page 141.

### Features and Benefits

- Excellent DC performance
- Low arc voltage and low energy let-through (I²t)
- Low watts loss
- Superior cycling capability

### Typical Applications

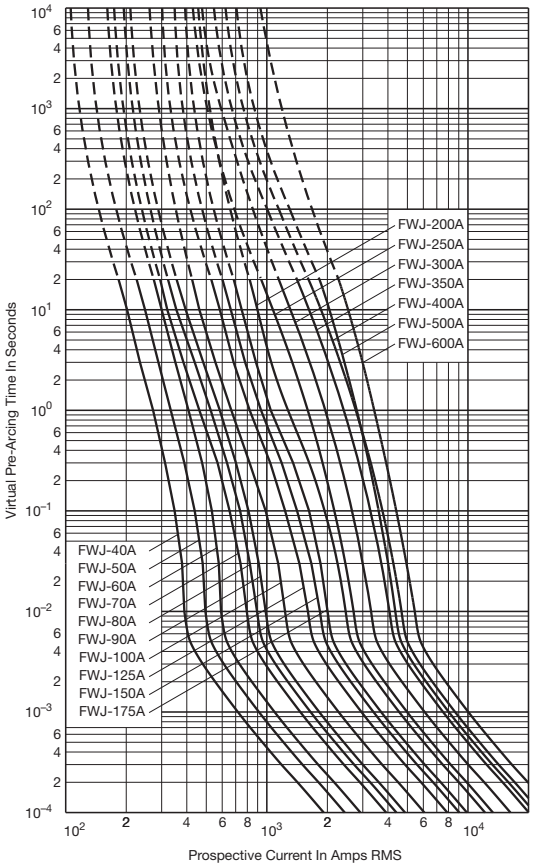
- DC Common bus
- DC Drives
- Power converters/rectifiers
- Reduced voltage starters

**Data Sheet: 720027**

# North American — FWJ 1000V: 35-2000A

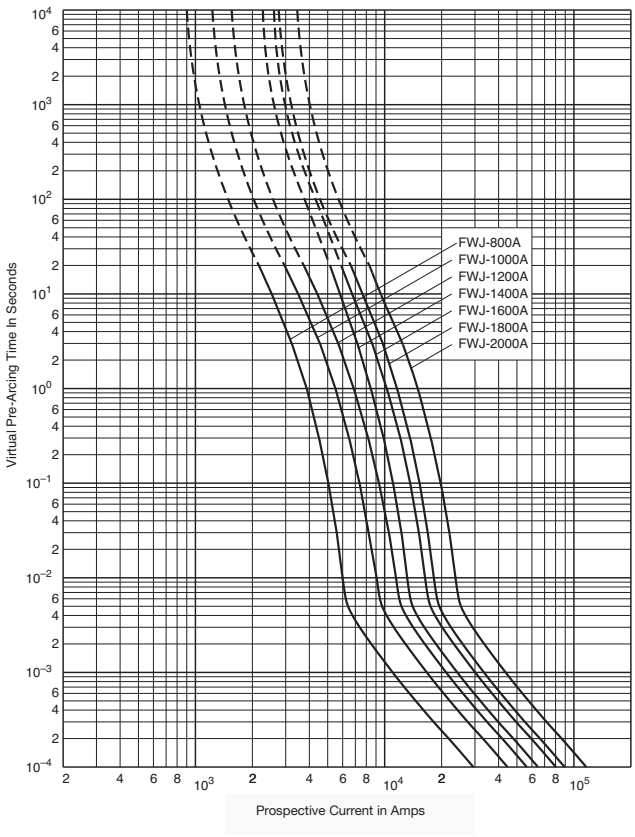
## FWJ 35-600A: 1000V

### Time-Current Curve



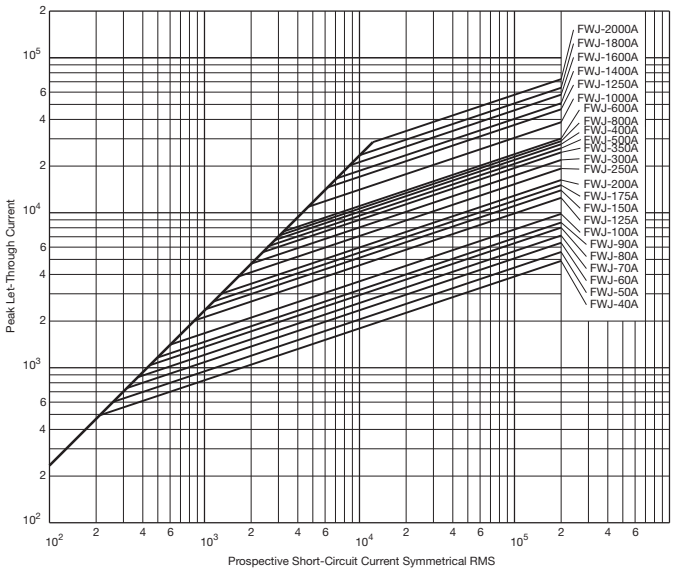

## FWJ 800-2000A: 1000V

### Time-Current Curve




**Data Sheet: 35785309**

### Peak Let-Through Curve




**Data Sheet: 35785303**

# North American Fuse Accessories

## Fuse Bases (Blocks)

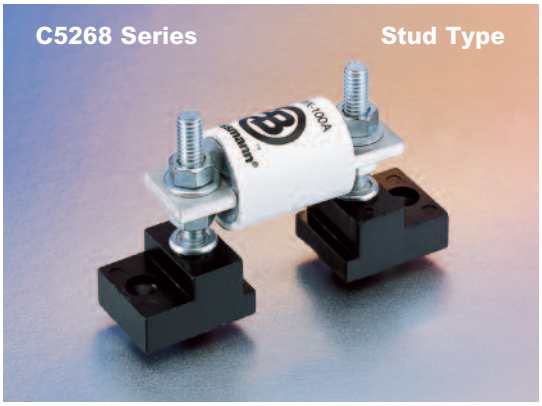
### Modular Style

Bussmann offers a comprehensive line of fuse bases that provide the user with design and manufacturing flexibility. Two identical half bases make up a Bussmann modular fuse base. These "split" units can be panel mounted any distance apart to accommodate any length fuse.

### Stud Type (Not sold in pairs)

The simpler design is the C5268 Series modular fuse base. With this design, the fuse terminal and cable (with termination) are mounted on the same stud, minimizing labor needed for installation. The stud type base is available in the configuration shown in the table below.

| Catalog Number | Max Fuse Amp Rating | Stud Height (in) | Stud Dia. & Threads |
|---|---|---|---|
| C5268-1 | 200 | 1.00 | 5/16"-18 |
| C5268-2 | 200 | 1.75 | 5/16"-18 |
| C5268-3 | 200 | 0.75 | 5/16"-18 |
| C5268-4 | 100 | 1.00 | 1/4"-20 |
| C5268-5 | 100 | 1.75 | 1/4"-20 |

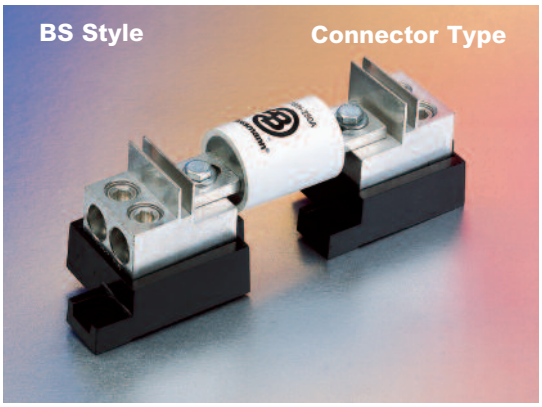



### Connector Type

Bussmann also offers a modular style fuse base that utilizes a tin-plated connector (for wire termination and heat dissipation) and a plated-steel stud (for fuse mounting). The connector type fuse base is available in the configurations shown below. Consult Bussmann for additional product details.

| Modular Base Style | Max Voltage | Max Fuse Amp Rating | Data Sheet Number |
|---|---|---|---|
| 1BS101 | 600 | 100 | 1206 |
| 1BS102 | 600 | 400 | 1207 |
| 1BS103 | 600 | 400 | 1208 |
| 1BS104 | 600 | 600 | 1209 |
| BH-0xxx | 700 | 100 | 1200 |
| BH-1xxx | 2500 | 400 | 1201 |
| BH-2xxx | 5000 | 400 | 1202 |
| BH-3xxx | 1250 | 700 | 1203 |

Refer to page 306 for BH style holders.




### Fixed Center Base Style

Bussmann offers a comprehensive line of fixed mount style fuse bases under the trademark TRON™ rectifier fuse blocks. The cable and fuse connections are similar to the stud type fuse base — both are mounted on the same stud. Consult Bussmann for complete product details.